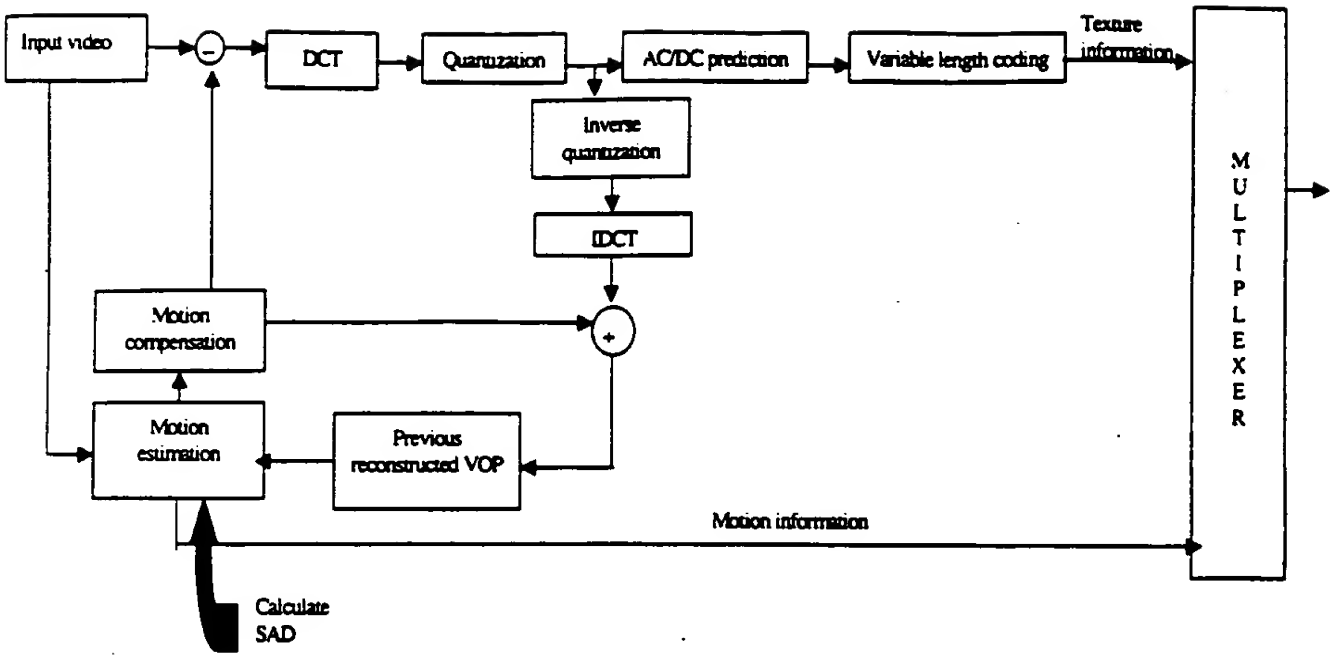
Input video
DCT
Quantization
AC/DC prediction
Variable length coding
Texture information
Inverse quantization
IDCT
Motion compensation
Motion estimation
Previous reconstructed VOP
Motion information
MULTIPLEXER
Calculate SAD

FIG. 1

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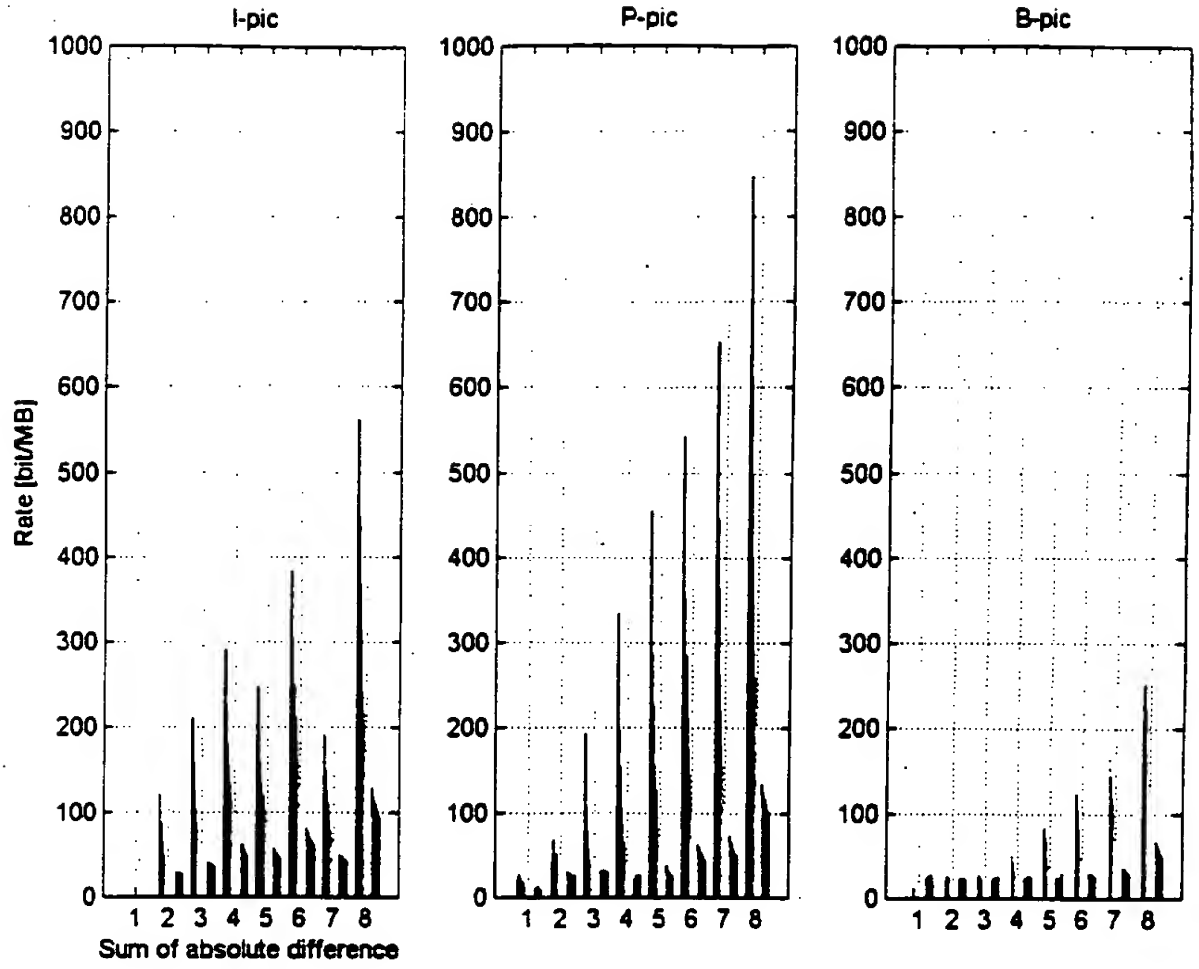
I-pic
P-pic
B-pic
Rate [bit/MB]
1000
900
800
700
600
500
400
300
200
100
0
1 2 3 4 5 6 7 8
Sum of absolute difference

FIG. 2

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$MQuant = Q_j \cdot N\_act_j$	
Estimated Quantization step size	$Q_j = d_j \cdot 31/r$
Virtual Buffer Discrepancy (d_j)	$d_j = B + S - j \cdot \frac{T}{N}$ B: current buffer status S: bits spent util (j-1)th macroblock T: bit budget for current frame N: # of macroblocks in a frame
Reaction Parameter (r)	$2 \cdot \frac{bit\_rate}{picture\_rate}$
Normalized Activity	$N\_act_j = \frac{2 \cdot act_j + avg\_act}{act_j + 2 \cdot avg\_act}$
MB Activity	$act_j = \min\{var\_of\_lum\_blk\}$ Note: it is the value of minimum variance among 4 luminance blocks in a macroblock.

FIG. 3

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Foreman (moderate to high motion)	TM5 rate control	Proposed rate control based on SAD
Bits/frame	4324	4412
PSNR	30.77	30.57

Irene (slow to moderate motion)	TM5 rate control	Proposed rate control based on SAD
Bits/frame	18822	18719
PSNR	36.31	36.03

FIG. 4

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